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Enterprise Digital Transformation, Driven by Technology, from a Cost Management Point of View

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Abstract

This research endeavors to investigate how technological aspects influence the digital metamorphosis of businesses.The exorbitant expense of running a business is largely attributable to the presence of monopolies and the costly access to data.The implementation of modern technology reduces the expensive fees associated with transactions, which in turn enhances the productivity of business processes, ultimately leading to a healthier economy.Simultaneously, digital transformation is a significant part of enterprise modernization, which is why it is broadly accepted by all industries.Nevertheless, the transformation of businesses into digital entities is a process that takes time and is largely determined by advancements in technology.This study examines empirically whether technology advancement has been the catalyst for digital transformation and investigates theoretically how technological advances and enhancements bring about digital transformation by cutting down the running costs of businesses.The utilization of blockchain among technologies (big data, cloud computing, artificial intelligence, blockchain) appears to be the most influential factor in the digital transformation of businesses, which is heavily dependent on technologies such as the Internet and big data.Hence, when utilizing blockchain technology, it is essential to emphasize the collaborative advancement of other relevant technologies, so as to create more potential for enterprises' digital transformation by reducing operational expenses.

Keywords

Technology Driven; Operational Costs; Digital Transformation; Real Economy.

1. Introduction

In the context of global economic integration and informatization, with the development and improvement of digital technologies such as the Internet and cloud computing, the digital economy has flourished. As a new economic format, digital economy has penetrated into all fields and links of economic and social development, and has become a key force to promote industrial upgrading, lead social development and change the international competition situation. According to the " Global Digital Economy White Paper " released by the China Institute of Information and Communications in 2022, the scale of the digital economy of 47 major economies in the world reached USD 38.1 trillion in 2021, accounting for 45 % of GDP, an increase of 15.5 % compared with 2020.The digital economy as a whole maintains a stable development trend and provides important support for global economic recovery. Digital technology is the technical support for the high-quality development of the digital economy. The integration of digital technology into the economy has created a strong connection between data, intelligent connectivity and the performance of the real economy, and has changed the product type, production process, organizational structure and business model of micro-enterprises. The digital transformation of enterprises not only refers to the application of emerging technologies such as big data, cloud computing, block chain and artificial intelligence, but also involves the comprehensive reconstruction and optimization of enterprise organizational structure and business process through technological innovation and

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implementation(Vial, 2019). Through this process, the company has revolutionized its value offering (Sebastian et al., 2017), business management methods, production techniques, and staff behavior, resulting in increased transparency (Yoo et al., 2010) and a more advanced level of management. This voyage is a lengthy, difficult and unpredictable undertaking that will take a great deal of time (Matt et al., 2015).

The academic community has been intently monitoring the digital transformation of businesses over the last few years, with research primarily targeting the forces behind it (Cichosz et al.,2020), strategic decisions (Sebastian et al.,2017) and practical implications (Ferreira et al.,2019). Management leadership, organizational culture, and employee engagement are crucial elements in achieving successful digital transformation (Cichosz et al., 2020; Fischer et al., 2020). The utilization of digital assets, the structure of the organization, and the development plans (Verhoef et al., 2021), along with the awareness of opportunities and reworking of changes (Warner and Wäger, 2019), significantly impact the digital transformation of businesses. The transformation strategies which are available include enhancing user interaction and restructuring the value proposition (Sebastian et al., 2017), customizing the product and adding value (Jin et al., 2020), adopting a strategic approach from gradual to drastic change (Li, 2020) and augmenting the exchange of knowledge regarding the external environment (Gupta and Bose, 2019). The existing literature has conducted a lot of research on the actual impact of digital transformation, and the research results show that. Digital transformation has a beneficial impact on corporate image (Ferreira et al., 2019), service excellence (Zaki, 2019), cost-effectiveness (Ferreira et al., 2019), customer loyalty (Fernández-Rovira et al., 2021), supply chain collaboration (Belhadi et al., 2021) and enterprise productivity (Nayal et al., 2022).The digital transformation level of China 's industrial sector is the highest at present, which is due to the progress of the digital transformation of enterprises. At present, the digital transformation of enterprises is still in the primary stage, and the data elements and technical elements are constantly accumulating and growing. However, the problem is that the market environment, core technology and talent pool on which the digital transformation of enterprises depends are lacking in many fields, resulting in high costs of digital transformation and insufficient profits for enterprises to make up for the potential of expenditure. Due to the cost of implementation, enterprises ' desire for digital transformation has been significantly reduced. Therefore, combined with the development process of digital transformation of Chinese enterprises, it is wise and necessary to explore the process of digital transformation of Chinese enterprises.

The implementation of technology will reduce corporate expenditures, resulting in higher profits and a ripple effect in the industry and area. This will motivate businesses to embrace digital transformation, providing them with more secure sources of income, lowering risks, and utilizing societal resources more efficiently, while simultaneously undoing any problems caused by high corporate transaction costs. The current research on the economic implications of new technologies facilitating the digital transformation of firms by cutting down operating costs is still in the early stages, and there is not much literature on the cost drivers of the digital transformation of firms. Despite the increasing attention to the use of technology in the real economy and its consequences in recent years, the application of technology to the digital transformation of companies remains a crucial subject of research. This paper aims to theoretically investigate the role of technology in the digital transformation of companies, with a focus on reducing operating expenses through the evaluation of transaction costs, and also to offer an empirical evaluation of the technology-induced digital transformation of firms. Based on this, a blueprint for Chinese enterprises to digitally transform through the use of technology is presented, along with the skills and guidance needed for future digital transformation.

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2. Synopsis of Past Studies

The proliferation of the digital economy and technological advancements have quickened the shift to digital transformation for businesses, aiding in the optimization of production elements and resulting in cost savings and enhanced efficiency for businesses. Enterprises must take a holistic approach to digital transformation in order to improve efficiency, which involves integrating industry and technology and has far-reaching implications for their organizational structure, business model, production model, and employment model. Most of the studies concentrate on the potential effects of digitization and the financial repercussions of a digital economic system in small businesses from the point of view of a specific IT, such as the association between digital transformation and labor power, enterprise output, job division, corporate responsibility, supply chain integration, and capital market fluidity. Many scholars argue that incorporating digital transformation into industrial manufacturing companies can reduce costs and improve efficiency. However, there is a dearth of research on how companies leverage advanced technologies like big data, blockchain, artificial intelligence, and cloud computing to achieve cost efficiencies through digital transformation.

The Vial (2019) research indicates that the fundamental aspect of digital transformation in organizations is to introduce critical modifications to operations through the unified utilization of digital tools. Hence, the level of technological advancement is the most influential factor in the digitalization of businesses. Generally, technology can be utilized to help businesses manage their operating expenses in four primary ways: (i) opening key supply chain links and developing tighter strategic partnerships with upstream and downstream partners. Reducing the steps required to procure something and eliminating unnecessary middlemen. Gaining proficiency in fundamental technologies. By proactively investing in research and development, it is possible to gain a head start on product development and thereby minimize procurement costs. (ii) Decrease expenditure on production by utilizing a greater percentage of regular components, combining operations, and enhancing production efficacy. (iii) Cut down on inventory expenses by organizing product divisions and storing facilities and setting up an early alert system to protect against non-payment. (iv)Decrease marketing expenditures by streamlining the customer base within the marketing procedure. This is demonstrated by:

In this age of vast amounts of data, the ability to leverage the potential business benefits locked within big data is critical for companies to gain an edge in the market (He et al.2023). The utilization of big data and cloud computing has lowered the expenses associated with storing, processing, and transferring data. Previous studies have suggested that data obstructions may impede companies from achieving higher levels of efficiency. A large proportion of customers in one area can weaken a firm's ability to negotiate (Gosman and Kohlbeck, 2009). Consequently, this can incur expensive outlays and augment the chances of failure (Brynjolfsson and McElheran, 2016; Patatoukas, 2012). In other words, Small and Medium Enterprises (SMEs) are particularly exposed to difficulties in obtaining financing in a market where there is an imbalance of information, due to the absence of tangible financial data (Stiglitz and Weiss, 1981). The advent of big data-driven digital transformation of enterprises has caused the stalemate to be broken. The utilization of big data and cloud computing, which employ sophisticated algorithms and calculations, can provide tremendous advantages to companies by surpassing the limitations of conventional cost management approaches, as evidenced by the capacity to extract, process, compute, evaluate, and forecast data to a much higher degree than is possible with human labor (Frey and Osborne, 2017; Agrawal et al., 2018).

Given the quick advancement of novel technologies such as big data, artificial intelligence, and industrial internet, industrial intelligence is essential to attain progress in manufacturing (Bhatia and Saurabh, 2020). The utilization of industrial intelligence, through machine learning and artificial intelligence methods, provides companies the opportunity to enhance value and

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knowledge management (Haleem, 2019; Sanchez et al., 2020), leading to improved productivity, cost savings, better process control, and ultimately, sustainable business growth. Although the development of AI technologies comes with a higher cost in terms of improved algorithmic computing power and data acquisition (Strubell et al., 2019), the implementation of AI in businesses can facilitate the early intervention of R&D in the procurement process, allowing enterprises to gain a competitive edge in the market. The implementation of standardized components in the production process, as suggested by Romer (1990) and Lin (2019), this can enhance productivity, thereby generating the financial flexibility needed to enable the digital transformation of enterprises.

Hawlitschek et al. (2018) strongly suggest that trust is essential for a functioning society. The most prevalent explanation of blockchain as a "distributed ledger" in the literature speaks to its decentralized nature, which is seen as its most innovative and influential element. The undeniable impact of blockchain technology on corporate supply chains in terms of increased transparency and cost savings, particularly the decrease in corporate procurement costs, should not be disregarded (Ko et al., 2018). This facilitates the formation of lasting partnerships which can in turn minimize expenditure. Smart contracts are digital mechanisms that enable, authenticate, carry out, and guarantee the conditions of commercial arrangements, which are automated, peer-to-peer transactions of various types that can facilitate the exchange of goods, the registration of legal documents, property transfers, or voting procedures(Cuccuru, 2017). The substantial influence of blockchain technology on the revitalisation of supply chain management is of great importance (Frizzo-Barker et al., 2020). Treiblmaier's (2018) research on the usage of blockchain in supply chain management has revealed the potential for technology to help decrease logistics expenses and enhance the synchronization of supply and demand. Recent studies conducted in the US high-tech sector have revealed that there is an effect of knowledge spillover in supply chain networks, and it has been suggested that customer innovation can have a substantial and beneficial effect on supplier innovation (Isaksson et al., 2016). The decentralized nature of blockchain technology ensures its high degree of integrity and security, making it invaluable for business applications (Sun et al., 2016). This diminishes the risk of trust issues to some degree. Blockchain technology can help reduce the expense of data gathering and processing for those who use it, allowing external forces to detect any attempts at data manipulation by companies, thereby restraining the ability of businesses to manipulate accounts (Yermack, 2017) and partly resolving the principal-agent dilemma (Vial, 2019). In addition, for financial institutions, additional efforts must be made to create structures for corporate financing (Rjoub et al., 2023). The benefits of blockchain technology in the area of corporate finance are evident in three main ways: (1) By linking and verifying data, it enhances the accuracy of financial data and diminishes the informational disparities between the various parties involved in financing, thus reducing the expenses associated with evaluating and selecting information for businesses (Chod, 2020).(2) Blockchain technology's inventive trust protocol streamlines the financing process, diminishing the waste of productivity and the costs associated with middlemen.(3) The decentralization of blockchain technology allows for all stakeholders and their assets to interact with one another.Blockchain's self-generated infrastructure allows for greater flexibility between connected entities and their assets while simultaneously decreasing the chance of settlement issues and mitigating the risk of delinquencies.

3. Research Design

3.1. Sample

The sample and data sources are described as follows: In this paper, the data of A-share listed enterprises in Shanghai and Shenzhen from 2007 to 2021 is selected as the initial research

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sample, and the data is processed as follows: (1) Financial enterprises are excluded; (2) Remove ST and *ST samples; (3) Eliminate missing values of control variable samples; (4) To mitigate the impact of outliers, 1% and 99% tail-reduction treatments were carried out for all micro-level continuous variables. Enterprise annual report text data from Juchao information network, other original data are from the National Tai 'an database (CSMAR), finally got 12887 observed values, but some variables have missing values, so there will be some deviation in the actual regression.

3.2. Model

In order to measure how technical factors affect the digital transformation of enterprises and avoid the bias caused by some time-dependent variables, we use the two-way fixed effect model to analyze and set the following model :

$$\boldsymbol{Digit_{it} = \beta_0 + \beta_1 Technology_{it} + \beta_2 control_{it} + u_i + \nu_t + \varepsilon_{it}}$$

1) The explanatory variable Technology is the technology composite index, which represents the degree of application of technology by enterprises. This paper uses text analysis to measure the application of enterprise technology. Specifically, a lexicon is established for the terms of subdivision indicators related to cloud computing technology, big data technology, blockchain technology and artificial intelligence technology in the annual report of the enterprise, and the word frequency of each keyword is obtained and summed up, and then the technical application indicators are obtained. Finally, each individual indicator is summarized into a technical comprehensive index.

2) Explained variable Digit represents enterprise digital transformation index is obtained by weighted calculation based on six indicators: strategic leadership, technology drive, organizational empowerment, environmental support, digital achievement and digital application. Detailed indicators and weights are as follows the table 1.

3) Control variables include the following: Size is the logarithmic form of the enterprise's asset size. Lev stands for enterprise's asset-liability ratio; Top1 is the percentage of shares held by the largest shareholder.; ROA stands for return on assets, calculated as the ratio of the current year's net profit to the total assets of the previous year; Growth represents the future growth of an enterprise.

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Table 1. The subdivision index and weight of enterprise digital transformation

Tier1 Indicators	Percentage of Tier1	Tier2 Indicators	Percentage of Tier2
Strategic Leadership	34.72%	Digital job creation for management	23.82%
		Prospects for digital innovation orientation of management	27.88%
		Continuity of Digital Innovation Orientation of Management	18.79%
		The breadth of digital innovation orientation of management	12.83%
		Strength of digital innovation orientation of management	16.68%
Technology Driven	16.20%	Artificial Intelligence Technology	55.04%
		Blockchain Technology	12.98%
		Cloud Computing Technology	18.32%
		Big Data Technology	13.66%
Organizational Empowerment	9.69%	Digital Capital Investment Program	50.22%
		Digital manpower input plan	25.53%
		Digital infrastructure construction	12.06%
		Construction of Science and Technology Innovation Base	12.19%
Environment Support	3.42%	Number of invention patents in the industry	19.23%
		R&D activities in the industry	17.79%
		New product development and sales in the industry	14.98%
		Strength of digital technology in the industry	11.57%
		Digital capital investment intensity in the industry	11.40%
		Investment intensity of human capital in the industry	7.89%
		Optical cable capacity in the city	4.77%
		Mobile exchange capacity in the city	4.03%
		The scale of Internet broadband access users in the city	4.00%
		The scale of mobile Internet users in the city	4.34%
Digital Results	27.13%	Digital Innovation Standards	36.68%
		Digital Innovation Papers	11.74%
		Digital Achievements	27.13%
		Digital Invention Patent	23.54%
		Digital Innovation Qualification	14.73%
		Digital National Awards	13.31%
Digital Application	8.84%	Technology Innovation	63.42%
		Process Innovation	23.78%
		Business Innovation	12.80%

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4. Empirical Results

Table 2 and Table 3 respectively show the descriptive statistics and correlation test results of the research indicators in this paper. Specifically, the average value of Digit is 33.63%, indicating that the average degree of digital transformation of listed companies in the sample studied in this paper is 33.63%, the maximum degree of digital transformation is 80.04%, and the minimum degree of digital transformation is 24.33%. It can be seen that there is a certain gap in the degree of digital transformation of listed companies in China, and the digital development of each company is unbalanced. There is also a big gap between the application of artificial intelligence, blockchain, cloud computing, big data and other technologies, as well as the application of comprehensive technologies, with a large difference between the maximum and the minimum. Finally, the average value of comprehensive technical indicators is 4.04 %, and the overall level is low, indicating that China is still in an environment with low technology penetration rate. There is a gap in the introduction of technology among enterprises, and among various technologies, blockchain and big data technology have great use value that has not been fully utilized.

Table 2. Descriptive statistics

Variable	N	Mean	p50	SD	Min	Max
Digit	12887	33.630	28.840	9.3858	24.329	80.040
Technology	12887	4.0442	0	16.770	0	291
AI	12887	0.9452	0	7.4975	0	258
Blockchain	12887	0.0355	0	0.6116	0	35
Cloud	12887	1.7417	0	8.5385	0	235
BigData	12887	1.3219	0	5.8277	0	137
Size	12887	20.198	20.110	1.7106	7.5931	27.320
Growth	12887	2.1678	1.6130	3.5389	0.6837	259.15
Lev	12887	0.4355	0.4316	0.2191	0.007100	1.6499
Roa	12887	0.0424	0.03790	0.06020	-0.7689	0.5981
Top1	12887	36.418	34.720	15.409	0.2900	89.990

Table 3. Correlation test

Variable	Digit	Technology	AI	Blockchain	Cloud	BigData	Size	Growth	Lev	Roa	Top1
Digit	1										
Technology	0.0162	1									
AI	0.0148	0.7287	1								
Blockchain	-0.0041	0.2157	0.1142	1							
Cloud	0.0148	0.7669	0.2179	0.1518	1						
BigData	0.0063	0.7939	0.4791	0.1465	0.4455	1					
Size	-0.1776	-0.0002	0.0072	0.0056	-0.0033	-0.0062	1				
Growth	0.0793	0.0117	0.0073	-0.0024	0.0114	0.0076	-0.2660	1			
Lev	-0.1965	-0.0014	0.0044	-0.0132	-0.0017	-0.0059	0.3654	-0.0942	1		
Roa	0.1046	0.0023	0.0033	-0.0048	-0.0025	0.0065	-0.0854	0.0173	-0.3879	1	
Top1	-0.0854	0.0052	-0.0004	0.0040	0.0091	0.0018	0.2189	-0.0825	0.0742	0.0703	1

Table 4 reports the results of the impact of technical factors on the digital transformation of enterprises. Column (1) in Table 4 shows the regression results of controlling enterprise characteristic variables. The results show that the regression coefficient of enterprise artificial intelligence technology (AI) is significantly positive at 10%. In Column (2) of Table 4, the regression coefficient of blockchain technology (Blockchain) is significantly positive at the 5%

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level; In Column (3) of Table 4, the regression coefficient of cloud computing technology (Cloud) is significantly positive at the 1% level. In Column (4) of Table 4, the regression coefficient of big data technology (BigData) is significantly positive at the 5% level. In Column (5) of Table 4, the regression coefficient of the comprehensive technology application index (Technology) is significantly positive at the level of 1 %, which initially supports the hypothesis. According to the empirical results, among the means of technological innovation, blockchain has the highest impact on digital transformation. This is in agreement with earlier studies concerning blockchain (Chod et al., 2020).The integration of big data, cloud computing, and artificial intelligence technologies in enterprise digital transformation is facilitated by the implementation of blockchain technology, which further strengthens the authenticity and transparency of inventory, logistics, and capital flow verification in the supply chain. This sends a clear message to investors and related businesses regarding the operational capability of the company, leading to improved resource allocation and enhanced core competitiveness for high-quality enterprises. In general, for every 1 % increase in the technology composite index, the degree of digital transformation of enterprises will increase by 0.9 %.

Table 4. Regression results

	(1)	(2)	(3)	(4)	(5)
Variable	Digit	Digit	Digit	Digit	Digit
AI	0.0111*				
	(1.81)				
Blockchain		0.0756**			
		(2.09)			
Cloud			0.0152***		
			(2.89)		
BigData				0.0198**	
				(2.33)	
Technology					0.0090***
					(3.24)
Size	1.3421***	1.3431***	1.3419***	1.3436***	1.3403***
	(8.70)	(8.69)	(8.69)	(8.71)	(8.70)
Roa	-0.0523	-0.0337	0.0054	-0.0145	-0.0322
	(-0.04)	(-0.02)	(0.00)	(-0.01)	(-0.02)
Lev	0.7748	0.7873	0.7742	0.7660	0.7678
	(0.87)	(0.88)	(0.87)	(0.86)	(0.86)
Growth	0.7118***	0.7147***	0.7097***	0.7111***	0.7083***
	(8.35)	(8.36)	(8.34)	(8.35)	(8.34)
Top1	-0.1185***	-0.1181***	-0.1187***	-0.1188***	-0.1189***
	(-7.67)	(-7.64)	(-7.69)	(-7.68)	(-7.70)
Cons	9.2087***	9.1701***	9.2084***	9.1804***	9.2439***
	(2.98)	(2.96)	(2.98)	(2.97)	(2.99)
Number	9401	9401	9401	9401	9401
R^2	0.116	0.116	0.117	0.116	0.117
Year fix	YES	YES	YES	YES	YES
ID fix	YES	YES	YES	YES	YES

Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1. Same below.

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Table 5 shows the robustness results of this paper. In this paper, GMM model is adopted for further empirical test on the research samples, and it can be seen that the positive significance is generally displayed. The regression coefficient of AI is 0.2178, which is significantly positive at the 5% level. The Blockchain regression coefficient is 1.1251, which is significantly positive at the 5% level. The regression coefficient of BigData is 0.1844, which is significantly positive at the 10% level. The Technology regression coefficient is 0.0433, which is significantly positive at the 10 % level.Cloud computing has not been highly significant. The results of the control variables were roughly similar to those of the main regression.

Table 5. Robustness test

	(1)	(2)	(3)	(4)	(5)
Variable	Digit	Digit	Digit	Digit	Digit
L. Digit	0.9655***	0.9652***	0.9450***	0.9621***	0.9556***
	(47.92)	(40.44)	(38.24)	(43.59)	(38.47)
AI	0.2178**				
	(2.12)				
Blockchain		1.1251**			
		(2.11)			
Cloud			0.0198		
			(0.42)		
BigData				0.1844*	
				(1.67)	
Technology					0.0433*
					(1.51)
Size	0.1431**	0.1516**	0.1544**	0.1625*	0.1365
	(2.20)	(1.98)	(2.14)	(1.91)	(1.60)
Roa	-14.1739**	-10.6856*	-8.1324	-11.8238*	-10.6329**
	(-2.07)	(-1.78)	(-1.36)	(-1.72)	(-2.24)
Lev	-1.6020	-1.7672	-2.4654	-2.0898	-1.4036
	(-0.98)	(-0.85)	(-1.33)	(-0.95)	(-0.69)
Growth	0.9319***	0.8565***	0.8437***	0.9633***	0.9367***
	(4.64)	(4.67)	(4.56)	(5.49)	(4.14)
Top	-0.0274***	-0.0325**	-0.0140	-0.0315**	-0.0240
	(-3.39)	(-2.20)	(-0.88)	(-2.03)	(-1.58)
Number	5708	5708	5708	5708	5708
R^2	0.116	0.115	0.116	0.117	0.117
Year fix	YES	YES	YES	YES	YES
ID fix	YES	YES	YES	YES	YES

5. Conclusion

Ultimately, the digital evolution of the business must be driven by data, and the design of the data repository cannot be accomplished without technological advances.Realizing digital transformation requires the implementation of big data, cloud computing, blockchain, and artificial intelligence technologies in businesses, and their incorporation into every facet of their operations. This paper puts forward another view on the investigation of enterprise digital transformation catalyst, especially the view of operation cost. On the one hand, the introduction of technology will lead to an increase in the operating cost of the enterprise, that is, the initial cost. On the contrary, as technology is increasingly incorporated into business

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operations, operating costs are likely to be reduced due to the cumulative impact of data collection, computing capacity expansion, data linking and technological advances. Although enterprises that initiate digital transformation in their industries have to face the risk of new technology implementation, they will eventually gain returns that improve efficiency, reduce costs and higher profit margins, eventually leading to an industrial revolution. Firms that initially embraced digitization moved toward the level of subsequent industrial evolution because of the benefits of data, cost-effectiveness, and productivity. In general, industry stakeholders from producers to consumers are taking advantage of the benefits of digital technology and starting the journey of digital transformation, thus realizing the digitization of the entire industry and its supply chain.

Digital transformation is a long process. On the one hand, the government should guide enterprises to accept, absorb and apply cutting-edge technologies, promote changes in production methods and governance structures, speed up the construction of digital systems such as digital production lines, digital analysis and decision-making, and product life cycle management, and promote the improvement and optimization of internal organization, production and operation management and supply chain upstream and downstream collaboration mechanisms. On the other hand, the government should encourage enterprises with knowledge advantages to carry out technological innovation and accelerate the deep integration of digital technology with products, services and business models. In addition, the driving force behind technological progress is the optimization of chip capabilities and other related components. The implementation of digital transformation requires the government to focus on the growth of semiconductor and other related technologies to support the industry, so as to establish a virtuous circle of technological progress to promote digital transformation.

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